REMARKS

I. Introduction

In response to the Office Action dated September 25, 2008, which was made final, subsequent to the Request for Continued Examination (RCE) submitted on February 25, 2009, and subsequent to the Amendment under 37 C.F.R. §1.114 also submitted on February 25, 2009, claims 1, 17 and 18 have been amended. Claims 1-26 remain in the application. Re-examination and re-consideration of the application, as amended, is requested.

II. Telephone Interview Summary

Record is made of a telephone interview between Examiner Jackson and Applicants' attorney that took place on March 24, 2009. During the interview, the references and claims were discussed, but no agreement was reached. This supplemental Amendment under 37 C.F.R. §1.114 is being submitted in response to the interview.

III. Prior-Art Rejections

On page 2, the Office Action rejected claims 1-26 under 35 U.S.C. §102(b) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as being obvious over Palacios et al., S.S.T. 15 (2000) pp. 996-1000 (Palacios). On page 3, the Office Action rejected claims 1-26 under 35 U.S.C. §103(a) as being obvious over Palacios with Wong et al., APL 10/2000 Vol. 77 No. 18 pp. 2822-2824.

Applicants' attorney has amended the claims to overcome these rejections. Applicants' attorney submits that the references do not teach or suggest Applicants' amended claims.

A. Applicants' Independent Claim 1

Applicants' independent claim 1 recites a novel device structure not shown by the references. Specifically, Applicants' independent claim 1 has been amended to recite that a surface of the nitrogen face (N-face) of the LED is structured into a plurality of cones to enhance extraction of the light out of the surface, and each of the cones is at least the size of the wavelength of the light extracted through the surface.

Neither Palacios nor Wong describe the same surface structure.

The size of Palacios' pyramids is 50 nm, which is too small to improve the light extraction efficiency (Palacios, page 998, Figure 4(a)). In order to extract light, the size of the structures should be at least the size of the wavelength of the light emitted by the LED:

> Applicants' specification: page 11, line 20
> The cone-shaped surface appears very effective for light extraction from the LED. Moreover, experimental results suggest that a cone shape can extract more light. **For example, the wavelength of a blue LED in a GaN crystal is about 200 nm. If the size of the cone shape is much smaller than that value, then the light might not be affected by the roughness.** On the other hand, if the size of the cone shape is close to that value, the light might be scattered or diffracted.

Thus, Palacios' pyramidal nanostructures would have a negligible effect, if any, on extraction of emitted light.

In addition, Palacios does not describe an LED structure. Instead, the structure described in Palacios is merely GaN doped with Si on an AlGaN buffer layer on a sapphire substrate. In Palacios, the GaN is a thick slab 0.5 - 2 microns thick (Palacios, page 997 ,column 1), which is about 1000 - 10,000 thicker than a quantum well.

Wong fails to overcome the deficiencies of Palacios. Wong merely describes a GaN based LED structure, but nowhere describes the same surface structure as recited in Applicants' claims. Palacios combined with Wong would result in the etching of emitting layers to increase photoluminescence (PL) intensity for the emitting layers, but does not teach or suggest structuring an N-face surface of an LED to enhance light extraction from the N-face surface.

B. Applicants' Independent Claim 17

Applicants' independent claim 17 recites a novel fabrication method not shown by the references. Specifically, Applicants' independent claim 17 has been amended to recite that a (B, Al, Ga, In)N based light emitting diode (LED) is created by fabricating one or more layers of the (B, Al, Ga, In)N based LED on a substrate, exposing a nitrogen face (N-face) surface of the layers by removing the substrate; and then structuring the N-face surface after the substrate is removed to enhance extraction of light from the emitting layers of the LED out of the N-face surface.

Neither Palacios nor Wong describe similar steps.

In particular, neither reference teaches or suggest exposing an N-face surface of (B,Al,Ga,In) layers by removing the substrate, and then structuring the N-face surface after the substrate is removed to enhance light extraction.

C. Applicants' Independent Claim 18

Applicants' independent claim 18 recites a novel device structure not shown by the references. Specifically, Applicants' independent claim 18 has been amended to recite that a nitrogen face (N-face) surface of an n-type layer of a (B, Al, Ga, In)N LED is structured to enhance extraction of light emitted from an active region through the structured N-face surface of the n-type layer.

Neither Palacios nor Wong describe a similar structure.

Palacios etches a light emitting layer, e.g., an active region, not an n-type layer. Moreover, Palacios etches to increase internal quantum efficiency within the light emitting layer, not to enhance light extraction through an N-face of the n-type layer.

Wong merely describes a GaN based LED structure, but nowhere describes the same surface structure as recited in Applicants' claims.

D. Applicants' invention is patentable over the references.

Thus, Applicants' attorney submits that amended independent claims 1, 17 and 18 are allowable over the references. Further, dependent claims 2-16 and 19-26 are submitted to be allowable over the references in the same manner, because they are dependent on the independent claims, and thus contain all the limitations of the independent claims. In addition, dependent claims 2-16 and 18-26 recite additional novel elements not shown by the references.

IV. Conclusion

In view of the above, it is submitted that this application is now in good order for allowance and such allowance is respectfully solicited.

Should the Examiner believe minor matters still remain that can be resolved in a telephone interview, the Examiner is urged to call Applicants' undersigned attorney.

Respectfully submitted,

GATES & COOPER LLP
Attorneys for Applicants

Howard Hughes Center
6701 Center Drive West, Suite 1050
Los Angeles, California 90045
(310) 641-8797

Date: April 3, 2009

By:/George H. Gates/
Name: George H. Gates
Reg. No.: 33,500

GHG/

G&C 30794.108-US-WO